

CLAIMS

1. A radio communication system having physical control channels arranged for the bi-directional transmission of sets of control information between a secondary station and a plurality of primary stations, and at least one data channel between one or more primary stations, selected from the plurality of primary stations, and the secondary station for the transmission of data from the or each selected primary station to the secondary station, wherein respective closed-loop power control means are provided for adjusting individually the power of some or all physical control channels, or parts thereof, to which a set of control information is mapped.

2. A system as claimed in claim 1, characterised in that means are provided for encoding each downlink physical control channel, or part thereof, to which a set of control information is mapped with a respective scrambling code to enable the associated primary station to be identified.

3. A system as claimed in claim 1, characterised in that means are provided for transmitting power control commands relating to each downlink physical control channel, or part thereof, to which a set of control information is mapped via a single time-multiplexed uplink physical channel.

4. A system as claimed in claim 1, characterised in that means responsive to requests from the secondary station are provided for selecting the primary station connected to the or each data channel.

5. A system as claimed in claim 1, characterised in that means are provided for establishing a plurality of communication links between a primary station and the secondary station, for determining which of the primary stations comprise selected primary stations, and for determining which of the communication links are selected.

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6. A primary station for use in a radio communication system having physical control channels arranged for the bi-directional transmission of sets of control information between a secondary station and a plurality of primary stations, and at least one data channel between one or more primary stations, selected from the plurality of primary stations, and the secondary station for the transmission of data from the or each selected primary station to the secondary station, wherein closed-loop power control means are provided for adjusting the power of some or all physical control channels between the primary station and the secondary station, or parts thereof, to which a set of control information is mapped.

7. A primary station as claimed in claim 6, characterised in that means are provided for acquiring or releasing a data channel in response to changing radio link conditions, thereby becoming or ceasing to be a selected primary station.

8. A primary station as claimed in claim 6, characterised in that means are provided for determining operational parameters of the data channel depending on the power level of a physical control channel, or part thereof, to which a set of control information is mapped.

9. A primary station as claimed in claim 8, characterised in that the operational parameters are modulation and/or coding schemes.

10. A secondary station for use in a radio communication system having physical control channels arranged for the bi-directional transmission of sets of control information between the secondary station and a plurality of primary stations, and at least one data channel between one or more primary stations, selected from the plurality of primary stations, and the secondary station for the transmission of data from the or each selected primary station to the secondary station, wherein closed-loop power control means are provided

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for adjusting individually the power of some or all physical control channels, or parts thereof, to which a set of control information is mapped.

5 11. A secondary station as claimed in claim 10, characterised in that means are provided for determining which of the primary stations comprise the selected primary station or stations in response to changing radio link conditions.

10 12. A secondary station as claimed in claim 10, characterised in that means are provided for transmitting each set of uplink control information over a separate physical channel.

15 13. A secondary station as claimed in claim 12, characterised in that means are provided for distinguishing the physical channels by use of different channelisation codes.

20 14. A secondary station as claimed in claim 12, characterised in that means are provided for distinguishing two of the physical channels by transmitting a first physical channel which uses the in-phase component of the carrier and a second physical channel which uses the quadrature-phase component of the carrier.

25 15. A secondary station as claimed in claim 14, characterised in that means are provided for interrupting an uplink physical control channel when uplink data transmission is required.

30 16. A secondary station as claimed in claim 10, characterised in that means are provided for transmitting each set of uplink control information in a time-multiplexed manner over a single physical channel.

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17. A secondary station as claimed in claim 16, characterised in that means are provided for achieving the time-multiplexing by reducing the rate of transmission of power control commands.

5 18. A secondary station as claimed in claim 17, characterised in that the reduction of rate is in proportion to a number greater than or equal to the number of primary stations with which sets of control information are exchanged.

10 19. A secondary station as claimed in claim 16, characterised in that means are provided for achieving the time-multiplexing by including separate power control relating to each primary station with which sets of control information are exchanged in a single physical control channel.

15 20. A method of operating a radio communication system having physical control channels arranged for the bi-directional transmission of sets of control information between a secondary station and a plurality of primary stations, and at least one data channel between one or more primary stations, selected from the plurality of primary stations, and the secondary station for
20 the transmission of data from the or each selected primary station to the secondary station, the method comprising operating respective closed-loop power control means for adjusting individually the power of some or all physical control channels, or parts thereof, to which a set of control information is mapped.

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